A New Species and Conservation Status of *Schindleria* (Phytolaccaceae) from Peru

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Abstract. *Schindleria* (Phytolaccaceae) is a small genus of only three species from Peru and Bolivia. Routine identification of recent Peruvian collections has revealed a new species. *Schindleria tomentosa* Ricketson is described and illustrated, and its conservation status (CRB1D) and phylogenetic relationships are discussed. In addition, three synonyms are lectotypified (*Rivina densiflora* Kuntze var. *flavida* Kuntze, *S. weberbaueri* O. C. Schmidt, and *S. glabra* H. Walter), and a fourth synonym (*Villamilla rosea*) is deemed illegitimate.

Resumen. El género *Schindleria* (Phytolaccaceae) contiene solamente tres especies provenientes del Perú y Bolivia. Durante el transcurso de identificar colecciones peruanas se descubrió una especie nueva para la ciencia. Se describe e ilustre *Schindleria tomentosa* Ricketson y se discute su estado de conservación parentezco. Además, se lectotipifica tres sinónimos (*Rivina densiflora* Kuntze var. *flavida* Kuntze, *S. weberbaueri* O. C. Schmidt y *S. glabra* H. Walter), y se determine que otro sinónimo (*Villamilla rosea*) es ilegítimo.

Key words: Bolivia, Cusco, IUCN Conservation Status (CRB1D), Peru, Phytolaccaceae, *Schindleria*.

Schindleria H. Walter (Phytolaccaceae) is a small genus of only three species from Peru and Bolivia. The genus was named for Anton Karl Schindler (1879–1964), a German botanist who worked alongside Hans Walter at Halle. Schindler was a fellow contributor to Engler's *Das Pflanzenreich* and provided the treatment of the Halorrhagaceae. The genus *Schindleria* is defined by its semi-shrubby nature, mostly erect racemes, with a single floral bract and two minute bracteoles, perfect actinomorphic flowers, four tepals with usually three parallel veins, many stamens (12 to 25), one-carpellate ovary, and an utricle type of fruit.

Hans Walter (1906) described the genus, *Schindleria*, containing four species: *S. glabra* H. Walter, *S. racemosa* (Britton) H. Walter, *S. rivinoides* (Rusby) H. Walter, and *S. rosea* (Rusby) H. Walter, with no indication of the type species for the genus. Three additional species were added between 1909 and 1952: Walter (1909) described *S. mollis* H. Walter, Schmidt (1923) described *S. weberbaueri* O. C. Schmidt, and Monachino (1952) transferred *Rivina densiflora* Kuntze [= *S. densiflora* (Kuntze) Monachino]. Joan Nowicke (1969) presented the last complete treatment for the genus and reduced it to two species: *Schindleria densiflora* (including as synonyms *S. rosea*, *S. rivinoides*, and *S. weberbaueri*) and *S. racemosa* (including as synonyms *S. glabra* and *S. mollis*). She provided the following key to the species (Nowicke, 1969: 337):

a. Plants turning black or brown-black upon desiccation . . . . . 1. *S. racemosa*
aa. Plants remaining green or turning yellow upon desiccation. . . . . 2. *S. densiflora*

Although the above key has proven workable in the past, it is unclear how useful it is in the field with fresh material. The addition of a third species has now made the above key out of date. Thus a new key is presented here.

Key to the Species of *Schindleria*

1a. Filaments 3.8–4 mm long; inflorescence densely tomentose; tepals tomentellous abaxially. . . . . 3. *S. tomentosa*
1b. Filaments less than 2 mm long; inflorescence glabrous to densely tomentose; tepals glabrous abaxially.
  2a. Abaxial leaf surface tomentellous to densely tomentose along the veins; plants turning black or brown-black upon desiccation . . . . . 2. *S. racemosa*
  2b. Abaxial leaf surface scattered to densely puberulent along the veins; plants remaining green or turning yellow upon desiccation . . . . . 1. *S. densiflora*

Nowicke (1969) briefly reviewed the nomenclature of the genus and the species. However, some additional clarification is needed, and three of the synonyms are still in need of lectotypification.

Schindleria H. Walter, Bot. Jahrb. Syst. 37(Beibl. 85): 24. 1906. TYPE. Bolivia. Yungas, 1890, *M. Bang 414* (lectotype, designated by Nowicke (1969: 337–338), MO; isotypes, F, NY [2], US [3]).

1. Schindleria densiflora (Kuntze) Monachino, Phytologia 4: 39. 1952. Basionym: *Rivina densiflora* Kuntze var. *subrosa* Kuntze, Revis. Gen. Pl. 3(3): 268. 1898. TYPE: Bolivia. Santa Rosa, 2000 m, 1 Apr. 1892, *O. Kuntze s.n.* (lectotype, designated by Monachino (1952: 40), NY).

Rivina densiflora Kuntze var. *flavida* Kuntze, Revis. Gen. Pl. 3(3): 268. 1898. TYPE: Bolivia. Tunari, 2300 m, 4 May 1892, *O. Kuntze s.n.* (lectotype, designated here, NY).

Villamilla rivinioides Rusby, Bull. New York Bot. Gard. 4: 436. 1907. *Schindleria rivinoides* (Rusby) H. Walter, Bot. Jahrb. Syst. 37(Beibl. 85): 24. 1906. TYPE: Bolivia. Sine loc., s.d., *M. Bang 2607* (lectotype, designated by Nowicke (1969: 338), MO; isotypes, F, GH, NY [2], US [2]).

Schindleria weberbaueri O. C. Schmidt, Notizbl. Bot. Gard. Berlin-Dahlem 8: 313. 1923. TYPE: Peru. Huanuco: Prov. Huanuco, Tal des Mayro, ca. 10° S. Br., im immergrünen Buschwald, 400–500 m, July 1913, *A. Weberbauer 6758* (lectotype, designated here, F; isotype, GH).

Kuntze (1898) listed both variety *subrosa* and variety *flavida* as parts of his new taxon *Rivina densiflora*. Monachino (1952) designated the *R. densiflora* var. *subrosa* material as the lectotype for his new combination, *Schindleria densiflora*. Although the NY sheets are not clearly labeled as types, his publication specifically designates the Santa Rosa collection by Kuntze from Bolivia as the lectotype. With the lectotypification of the variety *subrosa* material, variety *flavida* becomes a synonym of *S. densiflora*. As stated above, Kuntze did not specify where this material was located; thus I hereby designate the NY collection of *Kuntze s.n.* from Tunari, Bolivia, as the lectotype for *R. densiflora* var. *flavida*.

Rusby (1907) designated the *M. Bang 2607* collection as the type of *Villamilla rivinioides* Rusby; however, he failed to designate where his type was deposited. Although it is generally assumed that the type is at NY, that material is not clearly marked; thus Nowicke (1969: 338) designated the MO sheet as the lectotype.

In Otto Schmidt's (1923) original description of *Schindleria weberbaueri*, the only material he lists is the *A. Weberbauer 6758* collection, although he did not designate where his type was located. It can be assumed that Schmidt may have had a sheet at B, since that is where he worked and the original description came out in a Berlin Garden publication. However, any material that was at B was destroyed in 1943, thus necessitating the need to select a lectotype. Although Nowicke (1969: 338) apparently studied a number of sheets ("F, GH, MO, NY"), she did not select a lectotype. Searches of the MO and NY herbaria have failed to discover this material. However, the F and GH sheets are present, and the F sheet is hereby designated as the lectotype.

A brief note is in order regarding the status of the specific epithet of *Schindleria rosea*, because this name has been continuously used in the literature. Walter (1906: 24) based his new combination, *S. rosea*, on "*Villamilla rosea* Rusby! Exsicc. Boliv. Bang. n. 1292." As stated by Monachino (1952: 39), "the name was based on a cheironym ... the name appears merely on the label of the herbarium sheet *Bang 1292*." However, because the basionym is nomen nudum any further combination is nomen illegitimum unless published with a valid description. Walter (1909), Heimerl (1934), Monachino (1952), and Nowicke (1969) all perpetuated the name without recognizing the problem, nor did they publish the name with a valid description. The name *S. rosea* is thus illegitimate and has no further standing, because the *Bang 1292* collection is clearly a specimen of *S. densiflora*. Additional confusion has occurred because Rusby (1896) published the new combination *V. rosea-oenia* (Lemaire) Rusby [= *Ladenbergia rosea-oenia* Lemaire = *Trichostigma peruvianum* (Moquin) H. Walter], based on a misidentification of the *Bang 1292* collection.

2. Schindleria racemosa (Britton ex Rusby) H. Walter, Bot. Jahrb. Syst. 37(Beibl. 85): 24. 1906. Basionym: *Villamilla racemosa* Britton ex Rusby, Mem. Torrey Bot. Club 4(3–4): 251. 1895. TYPE: Bolivia. Yungas, 1890, *M. Bang 414* (lectotype, designated by Nowicke (1969: 338), MO; isotypes, F, NY [2], PH not seen, US [3]).

Schindleria glabra H. Walter, Bot. Jahrb. Syst. 37(Beibl. 85): 24. 1906. TYPE: Peru. Sandia: Chunchusmayo, im Wald, 900 m, s.d., *A. Weberbauer 1168* (lectotype, designated here, Pflanzenr. IV. 83(Heft 39): 115, Fig. 33. 1909).

Schindleria mollis H. Walter, Pflanzenr. IV. 83(Heft 39): 116. 1909. TYPE: Bolivia. Ohne Standortsangabe [without indication of location], s.d., *W. Lobb 691* (holotype, W not seen; isotype, W photo [F neg. 29998] at MO).

Two collections, *M. Bang 414* and *H. Rusby 743*, are listed in the original description of *Villamilla racemosa* and are thus syntypes to one another. Although Britton and Rusby's types are generally considered to be at NY, neither specified where the types were deposited. Nowicke (1969) lectotypified the taxon with the *M. Bang 414* collection based on the MO specimen. Nowicke (1969) also designated the *M. Bang 414* material as the type for the genus, which had not previously been done.

In Walter's (1906) original description for the type of *Schindleria glabra*, he did not list where this type

was deposited. However, in Walter's (1909) treatment for *Das Pflanzenreich*, he does list a sheet from B, which unfortunately was destroyed in 1943. It appears that the *A. Weberbauer 1168* collection was a unicate. Searches of herbaria known to house specimens of Dr. August Weberbauer have failed to locate a duplicate of the collection. However, figure 33 on page 115 of Walter's (1909) treatment in Engler's *Das Pflanzenreich* is a drawing of the *A. Weberbauer 1168* collection. The same drawing appears in Heimerl (1934) and is referenced by Macbride (1936). With no specimen to choose from, I hereby designate the drawing in *Das Pflanzenreich* IV. 83(Heft 39): 115, fig. 33. 1909, as the lectotype.

The only known specimen of *Schindleria mollis* is the holotype at W, which I have not seen. However, based on a photograph (F neg. 29998) of the holotype at MO, it does appear that Nowicke (1969) was correct to place this taxon in synonymy under *S. racemosa*.

3. Schindleria tomentosa Ricketson, sp. nov. TYPE: Peru. Cusco: Urubamba, Dist. Machu Picchú, Troche Iran Bingham, 13°09′S, 072°13′W, 2207 m, 20 May 2003, *I. Huamantupa, J. Farfán, G. Huallparimachi 3267* (holotype, MO; isotypes, CUZ, F, FTG, K, NY, US). Figure 1.

Haec species ob corpus plantae viride vel flavoviride in sicco *S. densiflorae* similis, sed ab ea ramulis, venis abaxialibus, costis superioribusque rhachidibus inflorescentiarum dense tomentosis (non tomentellis usque dense puberulis) tepalis subter villosis (non glabris), laminis 3.2–12.1 × 0.9–4.7 cm (non 20 × 7 cm), petiolis 0.5–2.1 cm (non 7–9 cm), pedicellis 2.8–3.9 mm (non 7–9 mm) longis, tepalis 4.1–4.3 mm (non 2–3 mm) longis, denique filamentis 3.8–4 mm (non 1–1.5 mm) longis perfacile recognoscitur.

Liana or *semi-shrub*, 3–4 m tall; branchlets slender, terete, 3–4 mm diam., densely stalked-stellate and multi-armed dendritic-tomentose. *Leaves* with blades membranous, elliptic to elliptic-ovate, 3.2–12.1 × 0.8–4.7 cm, apically acute to acuminate, the acumen 0.4–1.7 cm long, basally acute to obtuse, adaxially tomentellous, except tomentose along the midrib, abaxially densely tomentose, especially along the midrib and secondary veins, the midrib impressed above, prominently raised abaxially, the secondary veins 8 to 15 pairs, impressed adaxially, prominently raised abaxially, the margins entire to shallowly irregularly crenate or erose; petioles slender, marginate, 0.5–2.1 cm long, densely tomentose. *Inflorescences* densely tomentose throughout, the lateral racemes 8–23 × 1–2.7 cm, erect, columnar, longer than the leaves, the rachis, 75- to 125-flowered; peduncles 1.7–4.2 cm long; floral bracts usually deciduous, membranous, acicular, 1.8–2.7 × 0.1–0.4 mm, apically acuminate, glabrous adaxially, barely to notably tomentellous abaxially, the veins inconspicuous, the margins entire; pedicels slender, terete, 3.4–7.1 mm long, densely tomentose; bracteoles 2, along the pedicel, membranous, persistent, ovate, ca. 0.2 × 0.2 mm, apically acute to short-acuminate, the margins entire, glabrous, usually buried in the tomentum of the pedicels; pedicels slender, terete, 2.8–3.9 mm long. *Flowers* 4-merous; tepals white, free, membranous, oblanceolate to spathulate, 4.1–4.3 × 1.6–1.7 mm, apically rounded, erose, 3-veined, glabrous adaxially, scattered villous abaxially, with scattered dendritic trichomes, the margins entire to slightly erose apically; stamens 18 to 25, membranous, 4–4.4 mm long, the filaments filiform, 3.8–4 × 0.08–0.12 mm, glabrous, the anthers white, erect, basifixed, thecae linear, separated except in the middle at the connective, 1.1–1.2 × 0.2–0.3 mm, apically and basally separated; each sac rounded on either end, glabrous, usually deciduous after anthesis; pistil 1-carpellate, 1.6–1.7 mm long, the ovary 1-locular, 1-seeded, compressed laterally and ridged along the edge, ovoid, 0.8–1 mm diam., the walls thin and transparent, the style absent or short-sessile, the stigma penicellate with many stigmas. *Fruit* an utricle, ovoid, compressed laterally and ridged or winged along the edge, thin walled, transparent, 1.3–1.9 mm diam., glabrous, often with scattered villous trichomes along the apical margins, the seeds brown to black.

Distribution and phenology. *Schindleria tomentosa* is known from the Department of Cusco, Peru, in the provinces of La Convención and Urubamba. It grows between 2200 and 2800 m elevation. Flowering March to September; fruiting May to September.

Ecology and conservation status. This species was collected in montane, primary and secondary wet forests in Peru. At this time, the IUCN designation for its conservation status is Critically Endangered: CRB1D (IUCN, 2001), because we know of only six localities over an area less than 100 km^2. However, Luis Valenzuela (pers. comm.) estimates that each locality contains several individuals (perhaps 3 to 5) and that the populations appear to be spreading. It is believed that continued collecting in the region will locate additional sites, and the conservation status may need to be adjusted in the future.

Schindleria tomentosa is one of three species in the genus. The species is unique because the vestiture covering the branchlets and leaves, especially along the veins, petioles, rachis, and pedicels, is dense-tomentose and the indumentum is composed of stalked stellate and multi-armed dendritic trichomes.

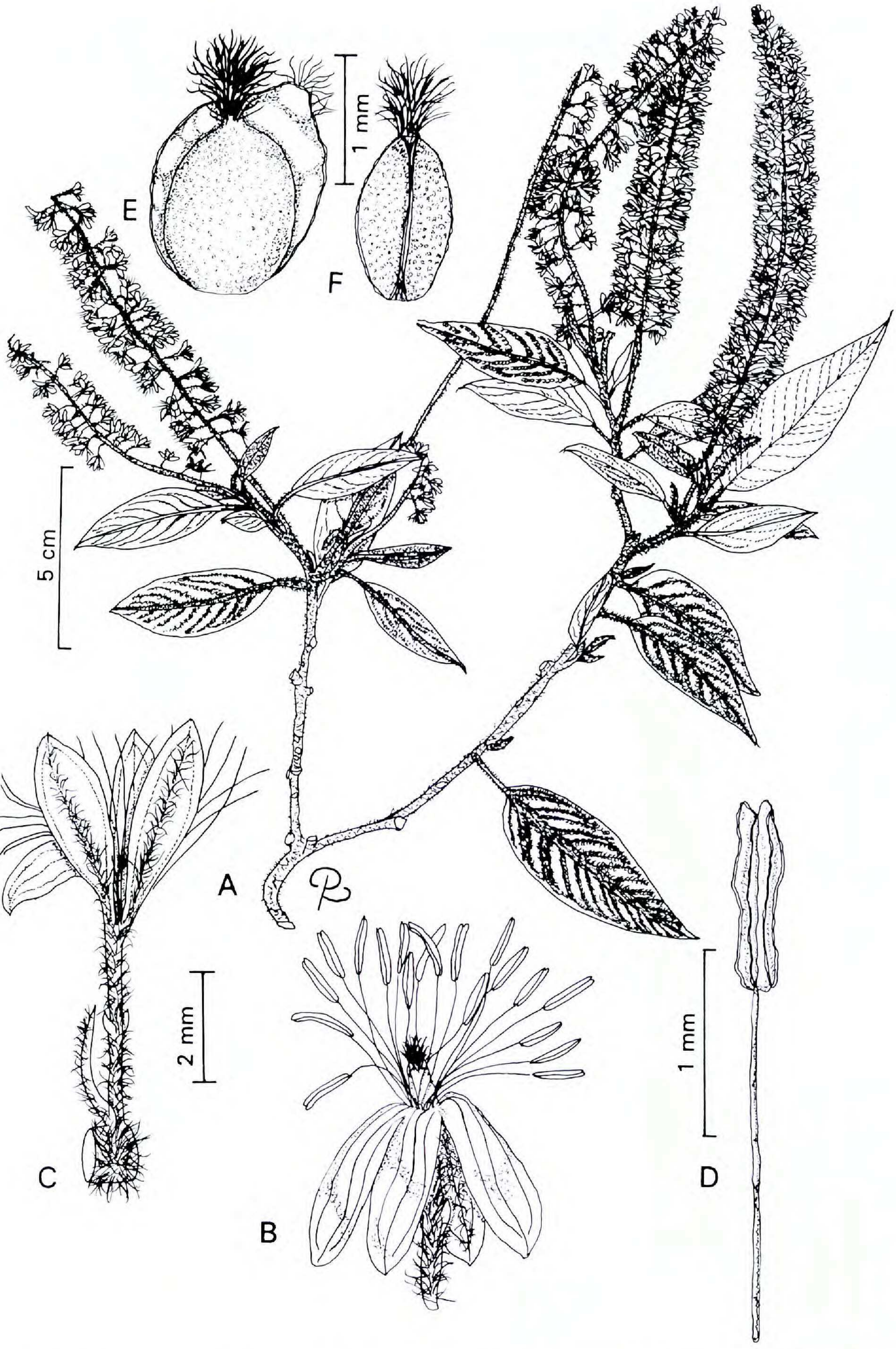

Figure 1. *Schindleria tomentosa* Ricketson. —A. Flowering branch. —B. Flower at anthesis. —C. Flower after anthesis showing floral bract and bracteoles. —D. Detail of stamen, showing anther after anthesis and upper portion of filament. —E. Fruit, face view. —F. Fruit, lateral view. A–F drawn from the holotype, *I. Huamantupa et al. 3267* (MO).

The vestiture of the pedicels and abaxial surface of the tepals is villous, of simple multicellular trichomes. The tepals are 4.1–4.3 mm long, and the filaments are 3.8–4 mm long.

The vestiture of *Schindleria racemosa* is sparse to scattered-villous on the branchlets, abaxial leaf surface, and rachis and dense only along the midribs of the abaxial leaf surface; the indumentum is of

simple multicellular trichomes. The pedicels and tepals are glabrous. The tepals are 2–3.5 mm long, and the filaments are 1.2–2 mm long.

The vestiture of *Schindleria densiflora* is sparse to densely puberulent on the branchlets, the veins of the abaxial leaf surface, and the midrib of the adaxial leaf surface and rachis. The pedicels and tepals are glabrous. The tepals are 2–3 mm long, and the filaments are 1–1.5 mm long.

Paratypes. PERU. **Cusco:** Prov. La Convención, Dist. Santa Ana, Poromate, *G. Calatayud et al. 1536* (AMAZ not seen, CUZ not seen, HUT not seen, MO, MOL not seen, NY, TEX, US, USM not seen); Prov. La Convención, Dist. Santa Ana, Tunquimayo, *E. Suelli & V. Chama 99* (AMAZ not seen, CUZ not seen, HUT not seen, LPB, MEXU, MO, USM not seen, W), *G. Calatayud et al. 2722* (B, CUZ not seen, F, MO); Prov. La Convención, Dist. Santa Ana, Subcuenca Chuyapi, Poromate, *L. Valenzuela et al. 479* (AMAZ not seen, CUZ not seen, FTG, G, GH, HUT not seen, MO, MOL not seen, USM not seen); Prov. La Convención, Dist. Santa Teresa, Yerbabuenayoc, *I. Huamantupa & A. Huamantupa 4305* (CUZ not seen, MO); Prov. Urubamba, Dist. Machu Picchú, *L. Valenzuela et al. 1730* (AMAZ not seen, CUZ not seen, F, FTG, HUT not seen, K, MO, MOL not seen, USM not seen).

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